Chapter 13
Topographic Survey Contracting and Cost Estimating

13-1. General Contracting Policies and Procedures

The following sections describe the process for contracting topographic and control surveying services, including related cost estimates. It covers development of survey scopes of work, performance specifications, and cost estimates for Architect-Engineer (A-E) contracts. Although this chapter is intended to provide guidance for estimating costs for surveying services, the explanations herein regarding procurement policies and practices describe only the framework within which cost estimates are used. For detailed guidance on procurement policies and practices, refer to the appropriate procurement regulations: FAR, DFARS, AFARS, EFARS, EP 715-1-7 (*Architect-Engineer Contracting*), and the PROSPECT course specific to A-E contracting.

a. Brooks Architect-Engineer Act. In the Federal government, professional architectural, engineering, planning, and related surveying services must be procured under the Brooks Architect-Engineer Act, Public Law 92-582 (10 US Code 541-544). The Brooks A-E Act requires the public announcement of requirements for surveying services, and selection of the most highly qualified firms based on demonstrated competence and professional qualifications. Cost or pricing is not considered during the selection process. After selection, negotiation of fair and reasonable contract rates for the work is conducted with the highest qualified firm. Topographic surveying supporting the Corps' research, planning, development, design, construction, or alteration of real property is considered to be a related or supporting architectural or engineering service, and must therefore be procured using Brooks A-E Act qualifications-based selection, and not by bid price competition.

b. Contracting processes and procedures. Corps procedures for obtaining A-E services are based on a variety of Federal and DOD acquisition regulations. The following paragraphs synopsize the overall A-E process used in the Corps.

(1) Types of contracts. Two types of A-E contracts are principally used for surveying services: Firm-Fixed-Price (FFP) contracts and Indefinite Delivery contracts (IDC). FFP contracts are used for moderate to large mapping projects (e.g., > $1 million) where the scope of work is known prior to advertisement and can be accurately defined during negotiations--typically for a large new project site. Due to variable and changing engineering and construction schedules (and funding), most mapping work involving surveying services cannot be accurately defined in advance; thus, these fixed-scope FFP contracts are rarely used, and well over 95% of surveying services are procured using IDC.

(2) Announcements for surveying services. Requirements for surveying services are publicly announced and firms are given at least 30 days to respond to the announcement. The public announcement contains a brief description of the project, the scope of the required services, the selection criteria in order of importance, submission instructions, and a point-of-contact. This public announcement is not a request for price proposal, and firms are directed not to submit any price-related information.

(3) Selection criteria. Federal and DOD regulations set the criteria for evaluating prospective surveying contractors as listed below. These criteria are listed in the public announcement in their order of importance. (The order listed below may be modified based on specific project requirements.)

- Specialized experience and technical competence in the type of work required.

- Professional qualifications necessary for satisfactory performance.
- Past performance on contracts with Government agencies and private industry in terms of cost control, quality of work, and compliance with performance schedules.
- Capacity to perform the work in the required time.
- Knowledge of the locality of the project.
- Utilization of small or disadvantaged businesses.
- Geographic proximity.
- Volume of DOD contract awards.

[Note: the last three items are secondary selection criteria--see EP 715-1-7 (*Architect-Engineer Contracting*) for latest policy on A-E selection procedures and evaluation criteria]

(4) Selection process. The evaluation of firms is conducted by a formally constituted Selection Board in the Corps district seeking the services. This board is made up of highly qualified professional employees having experience in architecture, engineering, surveying, etc. The board evaluates each of the firm's qualifications based on the advertised selection criteria and develops a list of the three most highly qualified firms for a single award (multiple awards have slightly different requirements). As part of the evaluation process, the board conducts interviews with these top firms prior to ranking them. The firms are asked questions about their experience, capabilities, organization, equipment, quality management procedures, and approach to the project. These interviews are normally conducted by telephone. The top three firms are ranked and the selection is approved by the designated selection authority. The top ranked firm is notified they are under consideration for the contract. Unsuccessful firms are also notified, and are afforded a debriefing as to why they were not selected, if they so request.

(5) Negotiations and award. The highest qualified firm ranked by the selection board is provided with a detailed scope of work (SOW) for the project, project information, and other related technical criteria, and is requested to submit a price proposal for performing the work. A guide specification for developing the basic contract SOW is at Appendix D (*Sample Scopes of Work and Guide Specifications for Topographic Surveying Services*). In the case of IDC, price proposals consist simply of unit rates for various disciplines, services, and equipment. This list becomes the contract "Schedule" of prices, and the schedule will also include provisions for overhead, profit, and incidental supplies. Once a fair and reasonable price (to the government) is negotiated, the contract is awarded. The Government Contracting Officer is obligated to strive to obtain a negotiated price that is "fair and reasonable" to both the Government and the contractor.

c. Survey personnel requirements and qualifications. The general personnel requirements that would be found on a topographic or control survey services contract are as follows:

- Contractor's Project Manager (PM). PMs shall be thoroughly familiar with all phases of surveys and their relationship to the design, construction, and development of major engineering projects, in addition to the contract supervision and administration aspects related thereto. As PM, this official shall exercise the full managerial control required to efficiently, economically, and technically administer all contract forces assigned to perform work under the contract.

- Professional Land Surveyor. Professional surveyors shall be thoroughly familiar with all phases of surveying as it pertains to control traverses, and establishing and reestablishing of property and/or boundary lines. They shall be qualified to perform supervisory and administrative duties in connection with economical and efficient operation; planning the work and making assignments; and in performing any other duties necessary for accomplishment of assigned work. Proof of registration will be furnished upon request. Land surveyors shall be licensed in the State where the work is performed. (Since many

topographic surveys involve ties to property corners, this work should be done under the supervision of a Professional Land Surveyor).

- Supervisory Surveying Technician (Party Chief). The Party Chief shall be thoroughly familiar with all phases of surveys for design and construction projects. These surveys will include design data, horizontal and vertical control surveys, geodetic surveys, cadastral, topographic and construction layout, profiles, cross sections, quantity, and measurement surveys. They shall also be qualified to make field computations for accomplishment of work assigned. Each field Party Chief shall be capable of planning the work for his party to obtain work efficiency and to gainfully utilize all of the members of his party.

- Survey Technician (Instrumentperson/Recorder). Instrumentperson/Recorders shall be capable of operating under supervision, survey instruments, including theodolite, transit, level, alidade, and electronic distance meters. They shall be experienced in keeping all forms of notes in a firm and legible hand, and operating data collectors.

- Survey Technician (Rodperson/Chainperson). Rodpersons/Chainpersons shall be assigned to perform a limited variety of simple repetitive tasks, such as but not limited to, holding rod or range pole for observation and measuring distances by steel tape.

- Engineering Technician (Drafter/Mapper/CADD Operator). A drafter shall be capable of preparing neat and legible drawings of topographic and property surveys; they shall have substantial experience in the drafting field including proficiency with CADD and be capable of performing assignments of originality or complexity. They shall be capable of applying initiative and resourcefulness in independent planning of methods.

- Civil Engineering Technician (Office Survey Computer). The survey Computer Person shall be capable of making all computations and adjustments required for all surveying, mapping, and geodesy requirements performed under the contract. The Computer Person shall have had extensive field experience in addition to a comprehensive mathematical computing ability. The Computer Person shall be designated with the authority to recommend re-observations when the data does not meet the accuracy specifications required under the contract. The Computer Person shall be thoroughly familiar with all computational techniques and procedures covered under the referenced technical specifications, e.g., COGO, GPS baseline reduction, network adjustments, coordinate transformations, etc.

13-2. Indefinite Delivery Contracts

The vast majority of the Corps surveying services are procured using Indefinite Delivery Contracts (IDC). These IDCs are procured using the selection and negotiation process described above. IDC (once termed "Open-End" or “Delivery Order” contracts) have only a general scope of work--e.g., "Topographic Surveying Services in Southeastern United States.” When work arises during the term of the contract, task orders are written for performing that specific work. Task orders are negotiated using the unit rate "Schedule" developed for the main contract. Thus, negotiations are focused on the level of effort and performance period. Task orders typically have short scopes of work--a few pages. The scope is sent to a contractor who responds with a proposal incorporating the scheduled rates, from which negotiations are initiated. Under emergency conditions (e.g., flood fights, hurricanes) contractors can be issued task orders verbally by the Contracting Officer, with the scope of work simply defined as a limiting number of days for survey crew at the contract schedule rate. The entire process--from survey need to task order award--should routinely take only 2 to 4 weeks. From the IDC Schedule, a survey crew and equipment is pieced together using the various line items--adding or deducting personnel or equipment as needed for a particular project.

a. Unit price basis. A number of methods are used by Districts for estimating and scheduling topographic surveying services in a fixed-price or IDC contract. The most common method is a "daily rate" basis, although hourly rates for personnel labor are used by some Districts. A daily rate basis is the cost for personnel or equipment over a nominal 8-hour day. In some cases, a composite daily rate may be estimated and negotiated for a full field crew (including all personnel, instrumentation, transport, travel, and overhead). A daily (or hourly) crew rate is the preferred unit price basis for estimating contracted survey services for IDC contracts and their task orders. It provides the most flexibility for IDC contracts, especially when individual project scopes are expected to vary widely. The crew personnel size, total stations, RTK systems deployed, vehicles, etc., must be explicitly indicated in the contract specifications, with differences resolved during negotiations. Options to add additional personnel and/or transport must be accounted for in the estimate and unit price schedule. Cost estimates for surveying services are usually broken down using the following detailed analysis method.

Table 13-1. Factors for Estimating A-E Costs

Item	Description
I	Direct labor or salary costs of survey technicians: includes applicable overtime or other differentials necessitated by the observing schedule
II	Overhead on Direct Labor *
III	G&A Overhead Costs (on Direct Labor) *
IV	Direct Material and Supply Costs
V	Travel and Transportation Costs: crew travel, per diem, airfare, mileage, tolls, etc. Includes all associated costs of vehicles used to transport personnel & equipment
VI	Other Direct Costs (not included in G&A): includes survey equipment and instrumentation, such as total stations. Instrument costs should be amortized down to a daily rate, based on average utilization rates, expected life, etc. Some of these costs may have been included under G&A. Exclude all instrumentation and plant costs covered under G&A, such as interest
VII	Profit on all of the above (Computed/ negotiated on individual task order or developed for all task orders in contract)

* these may be combined into a single overhead rate

b. Contract Price Schedule. The various personnel, plant and equipment cost items like those shown in Table 13-1 above are used as a basis for negotiating fees for individual line items in the basic IDC contract. During negotiations with the A-E contractor, individual components of the contractor's price proposal may be compared and discussed. Differences will be resolved in order to arrive at a fair and reasonable price for each line item. The contract may also schedule unit prices based on variable crew sizes and/or equipment. A typical negotiated IDC price schedule (Section B - Supplies or Services and Prices/Costs) is shown below in Table 13-2. The contract specifications would contain the personnel and equipment requirements for each line item. Each Corps district has its unique requirements and therefore line items used in schedules will vary considerably. For instance, some districts may elect to apply overhead as a separate line item. Others may compute profit separately for each task order and others may not include travel costs with crew rates. The following sample price schedule included 150% overhead on the labor rates. Profit is assumed to be a separate (but constant) line item (10.5%) that will be added to each Task Order.

(Technically, a formal IGE is not prepared for a basic Indefinite Delivery Contract since there is no scope of work; however, the same IGE preparation principles are used in estimating line items in an IDC schedule. An informal IGE can be prepared for Task Orders less than $100,000. An IGE for a Task Order will be prepared using the contract rates for labor, overhead, supplies, travel, etc.).

Table 13-2. Sample Contract Schedule of Services for an Indefinite Delivery Contract used for Topographic Surveying Services

LINE ITEM	UNITS	DAILY RATE
SUPV PROF CIVIL ENGINEER	daily	$795.60
SUPV PROF LAND SURVEYOR	daily	$681.20
REGISTERED LAND SURVEYOR	daily	$572.00
CIVIL ENGR TECH	daily	$364.00
CARTOGRAPHIC TECH (Includes CADD WorkStation Operator)	daily	$332.80
STEREO PLOTTER OPERATOR (Includes Photogrammetric Softcopy WorkStation)	daily	$455.52
ENGINEERING/CARTOGRAPHIC AID	daily	$309.92
G.I.S. SYSTEMS ANALYST (Includes CADD WorkStation)	daily	$582.40
G.I.S. DATABASE MANAGER (Includes CADD WorkStation)	daily	$542.88
G.I.S. TECHNICIAN (Includes CADD WorkStation)	daily	$343.20
PARTY CHIEF	daily	$384.80
PARTY CHIEF (OVERTIME)	hour	$28.86
INSTRUMENTPERSON	daily	$291.20
RODMAN-CHAINMAN-LABORER	daily	$234.00
4-PERSON TOPOGRAPHIC SURVEY PARTY	daily	$1,196.00
3-PERSON TOPOGRAPHIC SURVEY PARTY	daily	$904.80
2-PERSON TOPOGRAPHIC SURVEY PARTY	daily	$665.60
1-PERSON TOPOGRAPHIC SURVEY PARTY	daily	$502.98
MOB & DEMOB OF SURVEY PARTY	per project	$988.00
TOTAL STATION EQUIPMENT COST cost per instrument & data collector, per day	daily	$50.00
GPS EQUIPMENT COST cost per receiver, per day	daily	$75.00
FIELD COMPUTING PCS & SOFTWARE	daily	$50.00
MISC. ITEMS		
ATV	daily	$104.00
Milage-4 Wheel Truck	per mile	$0.60
SMALL SURVEY SKIFF BASIC RATE	daily	$93.60
W/Fathometer	daily	$107.12
Materials (PVC, steel fence posts, rebar, misc.)	daily	$10.00
PER DIEM (estimate actual costs on each Task Order--use JTR per diem rates)	daily	
PROFIT (use 10.5% for all task orders issued under contract)		

c. Personnel and crew line items. Individual line items in the above schedule need to be explicitly defined in the IDC specifications. For example, the specifications must define what instrumentation and plant, if any, is included on a “2-PERSON SURVEY PARTY.”

d. Overtime rates. Overtime rates should rarely be used--generally only during emergency operations. Task Orders issued under an IDC will be estimated based on nominal 40-hour weeks (8-hour or 10-hour workdays). Options to work overtime are the prerogative of the A-E contractor--it is not the Government's mission to tell a contractor how to schedule his forces. Overtime rates do not include overhead. Thus, in the above example, the $28.86 overtime rate for the "Party Chief" is based on 1.5 times a base hourly rate of $19.24. The daily rate of $384.80 is determined from $19.24/hr x 8 hr/day x 150% overhead rate.

e. Mob/Demob. This sample schedule shows a fixed mob/demob rate, which is used by some Districts. This is a carryover from traditional construction contracting where mob/demob is a bid line item. Generally, surveying services would not use a constant mob/demob rate as shown here--mainly because under an IDC the job location for the Task Orders is normally unknown. Mob/demob times would be applied to the time estimates for personnel and equipment in individual Task Orders. (There might be cases where the work site is the same installation for the entire contract period--then a fixed mob/demob rate would be applicable).

f. Excessive mob/demob costs. In the above sample schedule, the mob/demob rate of $988.00 exceeds the $665.60 daily rate for a 2-man survey crew. If a Task Order issued under this contract entails only one day of effort, then this not a cost effective contract for surveying services. An alternate A-E procurement mechanism should be used for a small amount of work--e.g., credit card issuance to a firm located near to the job site.

g. Miscellaneous items in Schedule. Generally, it is preferred to lump miscellaneous supplies into a crew rate or include it in overhead. The $10.00 line item in the above Schedule for "Materials" could have been included in the contract overhead. If there is a major requirement for supplies on a Task order, then this can be negotiated during the order--e.g., "200 monuments with bronze discs." The fewer the number of line items in the contract schedule, the easier it is to estimate individual task orders.

13-3. Cost Estimates for Contracted Topographic Mapping IDCs

Cost estimates are required for each line item in an IDC schedule. These estimates must be sufficiently detailed such that the Government negotiator can reach a "fair and reasonable" price with the selected A-E firm. Details on performing government cost estimates for A-E contracts are covered in EP 715-1-7 and the PROSPECT course "*A-E Contracting*." The following cost computations are representative of the procedures used in preparing the IGE for an A-E contract and/or an IDC contract price schedule. Costs and overhead percentages are shown for illustration only--they are subject to considerable geographic-, project-, and contractor-dependent variation (e.g., audited G&A rates could range from 50 to 200 percent).

a. Labor. Labor rates are direct costs and are estimated for each personnel line item required in the basic IDC contract. The estimated labor rate is obtained from a number of sources, such as:

- Prior contract rates
- Trade publications
- Equivalent GS rates
- Department of Labor published rates (including Service Contract Act minimum rates)
- Labor rates in other District IDCs

b. Indirect overhead costs. Overhead is an indirect cost--a cost that cannot be directly identified with the performance of a contract but is necessary for the normal operation of a business. Overhead is

normally broken into two parts: Direct and General & Administrative (G&A). Direct overhead includes items such as benefits, health plans, retirement plans, life insurance, etc. G&A includes office supervision staff, marketing, training, depreciation, taxes, insurance, utilities, communications, accounting, downtime, etc. (Care must be taken to ensure there is no duplication between G&A overhead and direct costs. An example of duplication might be a maintenance contract for a total station being included in both G&A and directly on the equipment cost). Usually direct and G&A overheads are combined into one amount and applied as a percentage against the base labor cost. Overhead rates are estimated using similar resources listed above for labor rates. Arbitrary limits on overhead rates should never be set. Overhead rates are negotiable and may optionally be audited before contract award.

The following is a sample IGE labor rate computation for two selected line items in a schedule: a party Chief and a Survey Aid. (2,087 hours per year assumed). Direct and G&A overheads are broken out for the Party Chief but are shown combined for the Survey Aid. A daily rate, hourly rate, and overtime rate is shown.

SAMPLE IGE LABOR RATE COMPUTATIONS

Supervisory Survey Tech (Party Chief)	$42,776.00/yr	*(based on GS pay schedule)*
Overhead on Direct Labor (36%)	$15,399.36/yr	*(based on historical rates)*
G&A Overhead (115%)	$49,192.40/yr	*(based on historical rates)*
Total:	$107,367.76/yr or $411.57/day or $51.44/hr	
	[Overtime rate: $42,776 / 2087 x 1.5 = $30.74]	
Survey Aid	$23,332/yr	*(based on GS pay schedule)*
@ 151 % O/H (36%+115%)	$58,563.32/yr or $224.49/day or $28.06/hr	
	[Overtime rate: $23,332 / 2087 x 1.5 = $ 16.77]	

c. Estimating equipment and instrumentation costs. The following is an example of instrumentation cost estimates in an IGE. Total station and RTK instrumentation rates used are approximate (2004) costs. The monthly “rental rates” are approximate long-term purchase agreement payments--daily cost must factor in estimated chargeable utilization each month--this can vary greatly. Associated costs for instrumentation, such as insurance, maintenance contracts, interest, etc., are presumed to be indirectly factored into a firm's G&A overhead account. If not, then such costs must be directly added to the basic equipment depreciation rates. Other equally acceptable accounting methods for developing daily costs of equipment may be used. Equipment utilization estimates in an IGE may be subsequently revised (during negotiations) based on actual rates as determined from a detailed cost analysis and field price support audits. The major variables in estimating costs are:

- Utilization rates. A particular survey instrument may be used (charged) only a limited number of days in a year. A total station or vehicle may be utilized well over 200 days a year whereas other instruments are not used on every project. For example, a $150,000 terrestrial scanner may be actually used only 20 days a year. If the annual operating cost of this instrument (without operator) is say $40,000, then the daily rate is $2,000/day. This is the amount that the contractor must charge to recoup his purchase or lease expenses (not including profit). A two-man survey crew may carry both a total station and RTK system with them in the field. Even though only one of these systems can be used on a

given day, both systems are chargeable for utilization. Utilization rates are difficult to estimate given they can vary widely from contractor to contractor, and with the type of equipment. Thus, the government estimator must have some knowledge of equipment utilization by a typical survey firm.

• Equipment cost basis. There are a number of methods to estimate the cost basis of a particular instrument. Trade publications (e.g., *POB*, *Professional Surveyor*, and *American Surveyor*) contain tabulations and advertisements with purchase costs, loan costs, rental costs, or lease costs. If an item is purchased, then an estimated life must be established--usually varying between 3 to 7 years for most electronic equipment and computers. Assuming the instrument is purchased on a loan basis, the annual/monthly cost can be estimated--e.g., a $40,000 instrument purchased over 5 years at 5% is $755/month. At 15 days/month estimated utilization, the daily rate would be $50/day. Lease rates published in trade publication also provide estimates for costs. Rental rates are applicable to obtaining IGE estimates. In general, rental rates will run between 5% and 15% of the original purchase cost, per month. Thus, a $40,000 instrument could be rented for $4,000 per month, assuming a 10% rate. If it is utilized 15 days a month, then the daily rental rate would be $266/day. Obviously, in the above examples, rental rates far exceed purchase rates. The IDC contract solicitation should have specified the desirability for ownership versus rental of instruments and equipment.

The following are selected example computations of equipment costs rates that would be used in preparing an IGE for an indefinite delivery contract schedule. The daily costs can be computed based on purchase (loan) costs or lease costs. A rental rate is another option.

ESTIMATING SURVEY INSTRUMENTATION & EQUIPMENT COSTS

Total Station: data collector, prisms, etc.		
$32,000 purchase cost @ 5 yrs life @ 120 d/yr utilization		$ 53/day
At a typical lease rate of $600/mo and 10 days utilization/mo		*$60/day*
RTK topographic system --2 geodetic quality GPS receivers, batteries, tripods, data collectors, etc.		
$30,000 purchase cost @ 4 yrs @ 100 d/yr		$ 75/day
Laptop, field--with COGO, GPS, and CADD software		
$15,000 purchase cost @ 3 yrs @ 200 d/yr		$ 25/day
Survey Vehicle $50,000 @ 4 yrs @ 225 d/yr	$ 55/day	
plus O&M, fuel, etc.	$ 25/day	$ 80/day
(A purchase or lease rate may be used. Optionally, a daily rental rate. The contract may be structured to pay actual mileage rates (e.g., $0.50/mile). Vehicle costs should not include those items covered under G&A, such as liability insurance, etc.)		
Misc Materials (field books, survey supplies, etc)		$ 15/day

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d. Travel and per diem. Travel and per diem costs are usually negotiated on individual task orders, based on the geographical location, transport vehicles (air, land, or floating plant), mob/demob times, etc. Maximum per diem is based on current JTR/GSA rates.

e. Material costs. The material cost estimate above could have been easily included in G&A overhead, given these are usually small amounts relative to the other labor and equipment line items. Unusual material costs on an individual Task Order can be negotiated as a lump sum item on the order--e.g., custom monuments.

f. Combined Crew Rates. The labor and equipment line items described above can be combined to obtain a single rate for a one or two man topographic crew. For example, a one-man crew would include a Party Chief, total station, computer, vehicle, and miscellaneous supplies. Using the above rates the daily cost of a one-man crew would be computed as follows:

Supervisory Survey Tech (Party Chief) [includes 151% O/H]	$411.57/day
Total Station (robotic): data collector, prisms, etc.	$53.00/day
Vehicle	$80.00/day
Miscellaneous expenses	$15.00/day
Subtotal	$559.57/day
Profit at 10%	$55.96/day
Total Crew Rate	$615.53/day

[Travel and per diem expenses would be added separately on a task Order]

g. Verification of Contractor Cost or Pricing. Regardless of the contract price method used, it is essential (but not always required) that a cost analysis and price analysis be employed to verify all cost or pricing data submitted by a contractor, particularly major cost items such as equipment and plant. Some operation and maintenance costs may be directly charged, or portions may be indirectly included in a firm's G&A overhead account. In some instances, a firm may lease/rent survey instrumentation or plant equipment in lieu of purchase. Rental would be economically justified only on limited scope projects and if the equipment is deployed on a full time basis. Whether the equipment is rented or purchased, the primary (and most variable) factor is the equipment's actual utilization rate, or number of actual billing days to clients over a year. Only a detailed audit and cost analysis can establish such rates and justify modifications to the usually rough assumptions used in the IGE. In addition, an audit will establish any nonproductive labor/costs, which are transferred to a contractor's G&A. Given the variable equipment costs and utilization rates in surveying (particularly in specialized instrumentation such terrestrial lasers), failure to perform a detailed cost analysis and field pricing support audit on contracted surveying services will make the IGE difficult to substantiate.

13-4. Task Order Time and Cost Estimates

Once unit prices have been negotiated and established in the basic IDC schedule as illustrated in the above sections, each IDC task order is negotiated primarily for effort. The process for estimating the time to perform any particular survey function in a given project is highly dependent on the knowledge and personal field experience of the government and contractor estimators. The negotiated fee on a task order is then a straight mathematical procedure of multiplying the agreed-upon effort against the established unit prices in Schedule B, plus an allowance for profit if not included in the unit rates. A formal IGE is currently (2005) only required for task orders over $100,000, along with a detailed profit computation, documented records of negotiations, etc. The scope is attached to a DD 1155 order placed against the basic contract. If a preliminary site investigation is scheduled for this project, any such adjustments should be investigated and resolved prior to negotiating subsequent task orders for the various phases of the work, to the maximum extent possible. As such, the negotiated costs for the subsequent work phases

would be considered fixed price agreements. Any later adjustments to these agreed to prices would be issued in the form of modifications to task orders (change orders), and would have to be rigorously defended as significant, unforeseen changes in the scope. The contractor would be expected to immediately notify the contracting officer (KO) or Contracting Officer's Representative (COR) of the need for cost adjustments. The following process (excerpted from Louisville District) is representative of the steps taken to initiate a Task Order in a District. Note that these procedures will vary from District to District.

- Request for survey/mapping information. Make sure proposed work is within the scope of services in the basic Indefinite Delivery contract. You may need to use another contract available through others in your district. You may also request contract capacity from another district. If you have in-house capability you may also propose to do this work using government resources. The schedule of the work request may also determine how you proceed. The contracting process takes time (up to 2 to 4 weeks or more) and in-house forces may be more readily available for projects requiring quick turn around.

- Develop Scope of Work (SOW). Request funding for your labor to develop SOW. You may develop the SOW with the help of your co-workers and you may also ask project related questions of the contractor. You may not discuss cost with the contractor at this time. Include a description of the work required, a schedule, quality control, and safety plan (if required). You may also reference the required engineering manuals which are available on-line.

- Review SOW with project manager (PM) and make necessary changes.

- Develop Independent Government Estimate (IGE) or Informal Working Estimate for small orders. Determine if original SOW matches project budget and verify availability of funds. If original request exceeds available budget, offer cost saving alternatives; e.g., aerial photography flown at a higher altitude or less detailed mapping and contours etc.

- Get money set up and moved in appropriate funding systems (P2/CEFMS) so you may create a Purchase Request & Commitment (PR&C).

- Get a labor code set up for Contracting personnel to process PR&C.

- Write labor PR&C.

- Write request for proposal (RFP) letter.

- Get PR&C reviewed and approved. Notify contracting office that the labor PR&C has been written and forward the SOW, IGE, and RFP. The contracting office will send RFP and SOW to the contractor. The contractor will normally have 10 days to submit their proposal. When contracting receives the proposal they will forward it to you for technical analysis. If the proposal is acceptable notify contracting and they will award the task order and send the notice to proceed to the contractor. If the proposal is not acceptable, identify items that are out of compliance and forward a list of these items to contracting as points of negotiation. Contracting will schedule a negotiation date. During the negotiation you will discuss the points of negotiation and come to an acceptable compromise with the contractor. You may need to modify your SOW and IGE based on the negotiations. Forward the updated contract documents and contracting will award the task order and send the notice to proceed.

13-5. Task Order Request for Proposal

Following is an example of a letter request for proposal for topographic surveying services. This proposed task order from Louisville District supports topographic and boundary surveys of a US Army Reserve Center. The Scope of Work (SOW) attachment to this letter is included here. Sample SOWs for other military and civil works topographic mapping surveys are provided at Appendix D in the other Application Project appendices to this manual.

SAMPLE LETTER REQUEST FOR PROPOSAL

26 March 2002

Survey and Mapping Section

EarthData International
45 West Watkins Mill Road
Gaithersburg, MD 20878

Gentlemen:

Reference is made to Indefinite Delivery Contract No. DACW27-00-D-0017 for survey and mapping services for the Louisville District Corps of Engineers.

Enclosed is a scope of work dated 25 March 2002 for topographic mapping and boundary survey of a proposed USARC site in the vicinity of Cleveland, OH. This work is for a delivery order under the above-referenced contract. Please submit your proposal no later than ten (10) calendar days after receipt of this letter. Return your proposal by mail to the U.S. Army Corps of Engineers 600 Dr. Martin Luther King, Jr., Place, Room 821, Louisville, KY 40202-2230, or by fax to 502/ 315-6194. Mark your proposal to the ATTENTION OF **CELRL-CT (PR&C W22W9K 20949148).**

The "Release of Claims" form should be submitted after completion of the project along with your Final Pay Estimate.

If you have contractual questions, please call Robin Woodruff at 502/ 315-6189. For technical questions concerning the scope of work contact Chris Heintz at 502-315-6408.

Sincerely,

Robin Woodruff
Contract Specialist

Enclosure

CF:
CELRL-ED-M-SM (C. Heintz)

The following is the Scope of Work that was attached to the above letter request for proposal:

SCOPE OF WORK
Contract No. DACW27-00-D-0017
EarthData, International

Date: 25 March 2002

Project: United States Army Reserve Center-Boston Heights, OH

GENERAL
The contractor, operating as an independent contractor and not as an agent of the government, shall provide all labor, material, and equipment necessary to perform professional surveying & mapping for the Louisville District Corps of Engineers. The work required consists of gathering field data, compiling this data into a three-dimensional digital topographic map of the proposed site for a United States Army Reserve Center in the vicinity of Boston Heights, OH.

This project also requires performing a boundary survey of the site. The details of the boundary survey are described in the attached scope of work.

The contractor shall furnish the required personnel, equipment, instrumentation, and transportation as necessary to accomplish the required services and furnish to the government digital terrain data, control data forms, office computations, reports, and other data with supporting material developed during the field data acquisition and compilation process. During the prosecution of the work, the contractor shall provide adequate professional supervision and quality control to assure the accuracy, quality, completeness, and progress of the work.

TECHNICAL CRITERIA AND STANDARDS
The following standards are referenced in specification and shall apply to this contract:

USACE EM 1110-1-1005, Topographic Surveying: This reference is attached to and made part of this contract. This reference is available at the following Internet Address http://www.usace.army.mil/inet/usace-docs/eng-manuals/em1110-1-1005/toc.htm and made part of this contract.

USACE EM 1110-1-1002, Survey Markers and Monumentation: This reference is available at the following Internet address http://www.usace.army.mil/inet/usace-docs/eng-manuals/em1110-1-1002/toc.htm.

Spatial Data Standards (SDS): This reference is available at the following Internet address http://tsc.wes.army.mil/.

ASPRS: American Society for Photogrammetry and Remote Sensing accuracy standards for large-scale maps. Digital Elevation Model Technologies and Applications: The DEM Users Manual.

SCOPE OF WORK
Professional surveying, mapping and related services to be performed under this contract are defined below. Unless otherwise indicated in this contract, each required service shall include field-to-finish effort. All mapping work will be performed using appropriate instrumentation and procedures to establishing control, field data acquisition, and compilation in accordance with the functional accuracy requirements to include all quality control associated with these functions. The work will be accomplished in accordance with surveying and mapping criteria contained in the technical references, except as modified or amplified herein.

The three-dimensional digital topographic map will be compiled in meters at a scale of 1:600, with ¼-meter (25 cm) contours. The mapping area is outlined on the attached map. All planimetric features will be shown. This includes, but is not limited to buildings, sidewalks, roadways, parking areas (including type such as gravel, paved, concrete, etc.), visible utilities, trees, road culverts (including type, size and inverts). Rim, ground surface and invert elevations and pipe sizes at sanitary manholes, cleanouts, storm manholes, inlets and catch basins, location of fire hydrants and water valves, location and type of fences and walls will be shown.

A referenced baseline with a minimum of two points will be established adjacent to each site. The location of the baseline will be set in an area that will not be disturbed. At least two benchmarks will be set within the map area. The baseline stations and benchmarks will be referenced and described. The Corps will supply survey disks on 30" aluminum rods and witness posts for the baselines. A spike in a pole, or chiseled square in a headwall, etc. will suffice for benchmarks. Real estate boundary monuments may be used as baseline monuments and TBMs. The descriptions of the baselines and benchmarks will be shown in the digital file on a separate level. In addition to showing the descriptions in the digital file, a hard copy of the descriptions will be submitted with the project report.

The coordinates of the mapping projects will be tied to the Ohio (North Zone) State Plane Coordinate System NAD83 and vertically tied to NAVD 1988.

PROJECT DELIVERABLES

The contractor will submit the final topographic map in digital format. The digital map will be submitted in MicroStation format, (*.dgn) on 3 ½" diskette or CD-ROM. The file will be created in MicroStation and not translated from other CADD software. The digital file will be created in 3-D with the topographic and planimetric elements placed at their actual X & Y coordinate locations. The global origin will be 0,0 and the working units will be 1000:1.The Louisville District Corps of Engineers CADD standards will be used. These standards contain the correct cell libraries, symbology and level assignments, colors, line weights, etc.

A project report will be compiled. This report will contain a general statement of the project, existing geodetic control used to establish new monumentation, condition of existing monuments, baseline and TBM descriptions and references, amount of adjustments, procedures and equipment used, all file names, any special features unique to this particular project, and personnel performing the surveying and mapping.

All field notes will be submitted in a standard bound survey field book or if electronic data collection methods were employed, all digital raw data files, in ASCII format will be submitted. If electronic data collection was the method of choice for capturing the information, the final X, Y & Z coordinate file, in ASCII format, will be submitted with the raw data file.

A metadata file describing the project. If necessary, the Government will supply Corpsmet software. Corpsmet is a program that puts metadata information into the proper format so it may be submitted to the national spatial data clearinghouse.

QUALITY CONTROL

A quality control plan will be developed and submitted. The quality control plan will describe activities taken to ensure the overall quality of the project.

The accuracy of the mapping will meet or exceed ASPRS map accuracy class 2.

Map verification will be performed at each site. The verification will be accomplished by collecting coordinates for 10 random points at each site and comparing them with the coordinates of the same points on the finished map. The random points will not be used to compile the finished map. Differences between the field-test information and the finished map will be compared with differences allowed by ASPRS map accuracy class 2 standards. Any areas found to be out of compliance must be corrected

before submittal. A summary of the actual vs. allowable differences along with a statement that mapping meets ASPRS map accuracy class 2 standards will be provided with the data.

SAFETY

Every safety measure feasible will be taken to insure the safety of the field personnel involved in this survey. All requirements of the U.S. Army Corps of Engineers EM 385-1-1, titled SAFETY AND HEALTH REQUIREMENTS MANUAL will be maintained.

SCHEDULE

All work will be completed and submitted by 15 May 2002. All information developed by the contractor during the course of this work will be the property of the United States Government, acting through the U.S. Army Corps of Engineers, Louisville District. Such information will not be released to others without the express written permission of the Corps of Engineers.

13-6. Government Cost Estimate for a Task Order

The following is an example of a cost estimate prepared for a small (4 day) topographic surveying project in Tulsa District. A more formal IGE is not required; however, the format shown on this informal estimate would be similar to that followed for an IGE. Labor and overhead rates are taken from the price schedule in the basic IDC contract. The 12% profit was computed for this task order using a weighted guideline method described in the next paragraph.

CONTRACT NO. DACW56-01-D-0000
TASK ORDER NO. 16

PAT MAYSE LAKE SCOUR AREA ALONG RIVER
TOPOGRAPHIC SURVEY
COST ESTIMATE
08JAN03

1. ESTIMATED FIELD TIME

PERSONNEL IN FIELD CREW	2	Crew
RECON AND ACCESS TO SITE	0.5	DAYS
ACCOMPLISH REQUIRED SURVEY	2.5	DAYS
TRAVEL	1	DAYS
TOTAL DAYS	**4**	

2. DIRECT LABOR COSTS:

A).	Project Manager		
2	Hrs x Rate	$26.00	$52.00
B).	Project Field Supervisor		
32	Hrs x Rate	$25.00	$800.00
C).	Instrument Man		
32	Hrs x Rate	$16.00	$512.00
D).	Cad Technician		
20	Hrs x Rate	$17.00	$340.00
Total Direct Labor Costs			**$1,704.00**

3. OVERHEAD (Direct + G&A)

115.00%	Direct Labor	$1,704.00	**$1,959.60**

4. PROFIT (Direct Labor + Overhead)

12.00%	of L + O.H.	$3,663.60	**$439.63**

5. INDIRECT COSTS

A). Survey Vehicle				
4	Days x Rate	$120.00		$480.00
B). Per Diem				
4	Days x Rate x	$103.00	2Men	$824.00
	Total In-Direct Cost----------			**$1,304.00**

6. TOTAL COST ESTIMATE---------- **$5,407.23**

The above time estimate allows 1 day for travel to/from the job site. This is paid at the crew rates instead of a separate mob/demob line item. The hourly rates from the basic IDC schedule do not include overheads--these are applied on the task order estimate as shown above. There is no separate estimate for survey instruments--this equipment is assumed to be included in the overhead. The 12% profit on this task order was computed and documented as shown on the following memorandum. Note that many Districts do not compute a profit for each task order as shown here. A profit is computed and negotiated when the initial IDC is set up. This constant profit will be used to cover the entire basic IDC--under the assumption that all the task orders that will be performed over the entire (3-year) contract period is of similar complexity, length, etc. Note also that profit was not computed on the "indirect costs" shown in the above Tulsa District cost estimate. Normally, profit is computed on the total estimated cost of a work order, including travel and transportation costs.

ALTERNATE STRUCTURED APPROACH CALCULATIONS
ARCHITECT-ENGINEER CONTRACTS
(Reference EFARS 15.404-73-101)

Project Description: Pat Mayse Lake Scour Erosion Area Topographic Survey

Project Schedule: The contractor is to commence with the project within one week (7 days) of award and final delivery made to the Government within 14 calendar days from date of award.

Element	**Range**	**Weight**		
Technical Complexity	0.05 - 0.10	0.090		
Length	0.02 - 0.04	0.030		
Socioeconomic Factors	0.00 - 0.02	0.000		
TOTAL		0.120	=	**12.00%**

For another example of a cost estimate on an IDC task order, see Appendix G (*Application: Topographic Survey of Hannibal Lock & Dam--Proposed Nationwide DGPS Antenna Site (Pittsburgh District*)).

13-7. A-E Services Request for Task Order Issuance

The following is an example of an internal action request to initiate contracting action to finalize the task order award. If the A-Es price proposal has been received, it would be attached to this memorandum along with the sample Technical Analysis memorandum shown below. Appropriate District elements responsible for negotiation and award would take action on this request.

ARCHITECT-ENGINEER SERVICES REQUEST

1. Negotiation and award of Architect-Engineer services is required for the following contract action:

   Location: Pat Mayse Lake Scour Erosion Sanders Creek

   Project: Topographic Survey

   Contract Number: DACW56-01-D-0000

   Task Order/Modification Number: 00-16

   Architect-Engineer Firm: ********** Surveyors, Inc.

   A-E Phone: (800) 123-4567 A-E Fax: (888) 123-4567

   A-E Point of Contact (if known): **********, PLS

2. The "DRAFT" Scope of Work is attached.

3. An appropriate Site History is attached.

4. The Approved Government Estimate is attached (~~or will be provided no later than _____~~).

5. The Project Execution Plan (PEP) Board Memorandum or waiver is attached for HTRW contract actions.

6. This contract action must be awarded absolutely no later than 24Jan03
   for the following reason/s: _____

7. Purchase Request and Commitment Number _____ has been approved and certified for this action and is attached. It will be amended for the total award amount following negotiations.

8. The Estimated Construction Cost (if applicable) is $_____.

9. The Project Manager is Marjorie Courtright, PLS at extension 7574.

10. Additional Remarks:

    Project Engineer: Bob Goranson
    Section: CESWT-EC-CD
    Extension: (918) 669-7
    Requesting Org: CESWT-EC-DD
    Date: 08Jan03

NOTE: Attachments should be via printed and electronic copies.

Pat Mayse Lake Scour Erosion Area Sanders Creek Topographic Survey
DACW56-01-D-1005
Task Order 16
Technical Analysis
Request for Proposal Results
14 Jan 03

Please note the following concerning the above referenced:

The lump sum cost estimate provided by *********, Inc. was more than the Corps projected cost by $ 96.32. This difference was a result of their firm estimating per diem time for the CADD Technician field crew time (this is acceptable since they considered no time for a Project Manager and less percent profit). The contractor has a clear understanding of what is required to perform the requested duties and the rates presented are correct as per contract DACW56-01-D-1005. It is therefore my opinion that we award *********, Inc. this task order #16.

PR & C #30130313 has been amended and certified for the final amount of $ 5,504.00.

Marjorie Ellenberg Courtright, PLS

13-8. Labor Hour Task Orders for Construction Surveying Services

Fixed-price task orders under IDC are effectively used to provide a substantial amount of surveying and mapping services in USACE. However, fixed-price task orders are not usually appropriate for quality assurance and payment surveys of ongoing construction projects since the duration of the survey work is not within the control of the survey contractor. The surveyor contractor's progress is dependent on the progress of the construction contractor, which in turn, depends on weather, equipment malfunctions, unforeseen site conditions, material availability, labor problems, and many other factors. In such cases, a labor-hour task order is a very useful contracting mechanism. Labor-hour contracts (guidance also applicable to task orders) are covered in Federal Acquisition Regulation (FAR) Subpart 16.6. Labor-hour task orders are appropriate when the uncertainties involved in contract performance do not permit costs to be anticipated with sufficient accuracy or confidence to use a fixed-price task order. The contractor is required to apply its best efforts, but is not obligated to complete the assigned work within the task order ceiling price. Hence, a higher level of surveillance is required by the Government to ensure the contractor is performing as efficiently as possible and cost controls are being used. No special approvals are required to use labor-hour task orders, but the contracting officer must execute a determination and findings for the contract file explaining why no other contract type is suitable. There is no true negotiation, but rather an agreement on a realistic ceiling price considering the most likely conditions. All hourly costs for personnel and equipment (including direct overhead, G&A, and profit) are already established in the contract. The Government buys a certain amount of effort and has considerable control over how that effort is expended toward completion of the specified task. The Government can direct the contractor to start, pause, and stop work, within reasonable limitations. However, the Government bears the cost for disruptions in work. A labor-hour task order has the flexibility to follow the progress of the construction, without unfairly holding the survey contractor to a fixed price. The most cost-effective situation is where there is more than one project in the same area that can be surveyed using one task order. If there is a delay on one project, the survey crew can relocate to another project and resume work with minimal lost time. The following is an example of a Labor Hour task order scope.

LABOR HOUR TASK ORDER

Furnish all personnel, plant, equipment, transportation and materials necessary to perform, process and deliver the survey data described herein for construction stakeout and payment surveys in the following work areas in accordance with the general instructions and conditions set forth in Contract DACWXX-XX-D-XXXX:

- [List projects or work areas. Attach marked-up maps if needed. Describe work.]

Since it is not possible to accurately estimate the extent or duration of this work, this order will be issued on an estimated, not-to-exceed basis. The estimated quantities and ceiling price in accordance with the established contract rate schedule are as follows:

3-Person survey crew @ $---/hour x [___] hours = $ _____
Project manager @ $---/hour x [___] hours = $_____

Ceiling price $ _____

It is estimated that this work will begin about [__(date)__] and be completed about [__(date)__]. The contracting officer's representative (COR) at the [_____] Project Office will advise the contractor at least [___] hours in advance of when work must begin. The contractor may be directed to stop work at any time due to circumstances beyond the Government's control. If work is stopped at a work area, the contractor may be directed to relocate and start (or continue) work at one of the other work areas covered by this order, or to demobilize and return to the contractor's office. The contractor will be compensated at the hourly contract crew rate while stopped, relocating to another work area, demobilizing, or remobilizing (if required). There will be no compensation while the contractor is demobilized. The COR will advise the contractor at least [___] hours in advance of when the contractor must remobilize and resume work.

The contractor will prosecute the work diligently and efficiently under the general direction and oversight of the COR. The contractor will provide a daily report, describing the work performed and hours worked, to the COR for certification. The daily reports will be used by the contractor to prepare monthly payment vouchers. With each monthly payment voucher, the contractor will estimate monthly and total earnings in the succeeding month, expressed both as total dollars and a percentage of the ceiling price.

The contractor will immediately notify the COR in writing when total estimated earnings reach 85 percent of the ceiling price. Also, if at any time the contractor projects that the total estimated earnings to complete the work will exceed the ceiling price, the contractor will promptly notify the COR and give a revised estimated total price with supporting reasons and documentation. The contracting officer will increase the ceiling price in writing if warranted or limit the work so as to remain within the current ceiling price. Exceeding the ceiling price is at the contractor's own risk.

[Insert technical requirements and deliverables.]

13-9. Hired-Labor Survey Cost Estimates

Cost estimates for USACE field forces engaged in topographic surveys are developed similarly to those for contracted field survey work described above. Normally, an average daily rate of personnel, travel, per diem, and equipment is established. Personnel labor costs are determined identically to those described above for A-E survey force labor--overheads are applied to the base wage rate of the government employee. Field crew personnel costs include direct labor, fringe benefits, technical indirect overhead, and direct overhead costs. Expenses for instrumentation and plant differ from commercial accounting methods since these charges are dependent on the method by which they were expensed at initial purchase. Equipment may be expensed against a single project account, or indirectly expensed against multiple projects. Land plant, floating plant, survey instrumentation, and CADD/computer systems may have established rental rates based on a revolving fund accounting process. Plant rental and survey equipment rental rates are usually developed at the time of purchase (or lease) may be periodically updated based on actual utilization rates as charged against projects. Various Plant Replacement and Improvement Program (PRIP) costs make up the expense. These daily plant rental rates may be recomputed annually, or more often if utilization changes significantly. The survey crew rate should also be periodically recomputed so that accurate and current cost estimates can be provided to requesting elements in a District.